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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201				
EXAMINER				
MAL NGOC LAN THI				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
02/04/2010		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@mwzb.com

Office Action Summary

Application No.

10/579,857

Applicant(s)

KLEIN ET AL.

Examiner

NGOCLAN T. MAI

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 13-16 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☒ Claim(s) 1-12, 17, 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG-08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

Claims 1-19 are pending wherein claims 1-16 have been amended and claims 17-19 are newly added in amendment filed October 1, 2009. Claims 13-16 have been withdrawn from consideration as being non-elected claims.

This application contains claims 13-16 drawn to an invention nonelected with traverse in the reply filed on 1/16/09. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Status of Previous Rejection

The previous rejections to claims 1 and 4-8 under 35 U.S.C. 102(b) as being anticipated by Ross (Pat 4,293,451), claims 1 and 4 as under 35 U.S.C. 102(b) as being anticipated by Bickler (Pat 4,388,346), and claims 2-3 and 9-12 under 35 U.S.C. 103(a) as being unpatentable over Ross in view of Martin et al. (U.S. Patent No. 4,564,563) and Tsunaga et al. (U.S. patent No. 5,045,236) are withdrawn or maintained in light of applicant's amendment filed October 1, 2009.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Objections

Claim 18 is objected to because of the following informalities: a period (.) should be used for numbers that have decimal point, e.g. 0.1 instead of 0,1. Appropriate correction is required.

Claim Rejections - 35 USC § 103

Claims 1, 4-8, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ross (U.S. Patent No. 4,293,451) in view of U.S. Patent No. 6,372,077 to Tecle.

Regarding claim 1 and 17 Ross discloses an ink composition for deposition upon the surface of a semiconductor device to provide a contact area for connection to external circuitry. The ink composition (column 3, lines 33-37) comprises a metal powder, a fluxing agent, a binder, and an organic solvent as a vehicle (column 4 lines 8-9). Ross teaches the fluxing agent is preferably of a type tending to dissociates oxides such as silicon dioxide to help insure better electrical and mechanical contact to the semiconductor device (column 4, lines 32-36). Ross teaches silver fluoride is preferred but other such as lithium fluoride, cesium fluoride, Teflon, ammonium fluoride (NH₄F) can be also be used (column 4, lines 36-39). The dissociation of silicon dioxide by fluxing agent is an etching process, the fluxing agent therefore acts as an etching agent as recited in the instant claim.

Ross differs from the claim in that Ross does not teach an unsaturated fatty acid.

Tecele teaches ultrafine particles having utility as conductive paths and/or conductive layers in electronic device often experiencing agglomeration into larger, less useful particles. Tecele discloses those skilled in the art have attempted to isolate ultrafine and fine particles in liquid suspension to prevent such agglomeration. See column 1, lines 17-37. Tecele then teaches a method for isolating particles by at least substantially encapsulating particles as a highly dispersed colloidal suspension with an encapsulant material. See column 2, lines 20-24. Tecele teaches preferred encapsulant materials for metal particles (Co, Ni, Cu, Pd, Ag, Pt, Au, Sn, Pb and mixture (column 3, lines 32-35)) are one or more compounds including oleic acid, which is an unsaturated fatty acid. See column 5, lines 58-60. Tecele in Example 3 C.2 discloses using oleic acid as an encapsulant material. Tecele teaches the encapsulated particle having a narrow particle size distribution and can be used for a variety of application such as for coating substrate, and additive such as fluxing agent, as well as a variety of surface treatment technique may provide enhanced adherence of the coating to substrate. See column 7, lines 1-22.

Since both Ross and Tecele teach in the same field of endeavor it would have been obvious to one skilled in the art to include an encapsulant material such as oleic acid as taught by Tecele in the ink composition of Ross in order to prevent agglomeration of metal powder and provide a useful particles for coating substrate.

Regarding claims 4 and 17, the fluxing or etching agent has removal activity of oxidation layers on the surface of the metal powders (column 4, lines 32-36).

Regarding claims 5 and 17, Ross teaches the if the contacts is to be formed on a solar cell which normally carries an anti-reflective coating in its, the ink may deposited and fired after the

anti-reflective coating is deposited and the fluxing agent will dissolve the anti-reflective layer in the area where the ink is deposited over such a layer (column 6, lines 44-52).

Regarding claims 6 and 17, the anti-reflective coating is SiO_2 , therefore the fluxing agent has removal activity of oxidation layers of Si (column 4, lines 32-45).

Regarding claim 7 Ross teaches silver fluoride is preferred but other such as lithium fluoride, cesium fluoride, Teflon, ammonium fluoride (NH_4F) can be also be used (column 4, lines 36-39). The fluxing agent taught by Ross overlaps those of the instant claims thus establishing a prima facie case of obviousness.

As for claim 8, Ross teaches (column 3, lines 57-61) that copper is normally preferred because it is relatively inexpensive and highly conductive however other conductive metal and/or alloys or combination thereof may be utilized. Ross also teaches (column 5, lines 66-68) other expensive noble metals such as silver or gold, or any other conductive metal may be utilized.

Claims 2-3 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ross and Teele as applied to claim 1 above and further in view of Martin et al. (U.S. Patent No. 4,564,563) and Tsunaga et al. (U.S. patent No. 5,045,236).

Ross teaches (column 4, lines 4-9) the binder is preferably being of a type that may be used in either an oxidizing or a reducing atmosphere and becomes fugitive at a relatively low temperature and the binder disclosed can be an acrylic polymer or polyvinyl alcohol.

Ross differs from the claims in that Ross does not teach binder containing thermosetting resin such as epoxy or phenolic resin (claims 9-10), organic solvent comprising polyhydric

alcohol such as glycerin and/or ethylene glycol (claims 11-12) or ink comprising diluents such as butyl carbitol (claims 2-3).

Martin discloses a solderable electrically conductive composition comprising silver metal powder embedded in a binder matrix formed from acrylic, carboxylated vinyl and epoxy. See abstract and column 2, lines 20- 33. Martin discloses (column 2, lines 38-45) the binder is dissolved in an organic solvent such as butyl carbitol (i.e., diethylene glycol butyl ether). Martin discloses (column 3, lines 36-54) during curing the solvent are evaporated and polymerization occurs, leaving hard, solderable, electrically conductive film that retains its adhesion properties and cohesion strength. Tsunaga discloses utilizing binder such as resol type phenolic resin and polyhydric alcohol as an organic solvent in copper conductive composition in order to obtain excellent conductivity and soldability of the cured film. See column 1, lines 54-68 and column 3, lines 35-44. The polyhydric alcohol disclosed can be butyl sellosolve, dibutyl cellosolve, methyl carbitol, ethyl carbitol, butyl carbitol, dibutyl carbitol, butyl cellosolve acetate, etc. See column 3, lines 35-40. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the conductive ink composition of Ross and Tecler by substituting phenolic resin and/or epoxy resin and polyhydric alcohol as recited in the instant claims as the binder and organic solvent, respectively for the noted improvement taught by Martin and Tsunaga.

Concerning claim 2-3, Martin (column 3, lines 8-9) teaches the solvent is butyl carbitol and the viscosity of the ink can be lowered with the addition of more solvent. Thus it would have been obvious to incorporate a diluent as taught by Martin in the ink composition of Ross

because such incorporation would achieve the predictable result of lowering the viscosity of the ink in and facilitate the deposition of the ink composition in the substrate.

Claim 18 is allowable because the prior art reference neither alone nor in combined teach or suggest paste composition comprising metal, etching agent, binder, organic solvent and unsaturated fatty acid having the concentrations as claimed.

Response to Arguments

Applicant's arguments filed October 1, 2009 have been fully considered and are persuasive regarding that the applied prior art does not teach the limitation of "unsaturated fatty acid" in the paste composition.

However the argument that the fluxing agent taught by Ross is for dissociation of material and does not result in removal" is not persuasive. Applicant is invited to look at [en.wikipedia.org/wiki/Flux_\(metallurgy\)](http://en.wikipedia.org/wiki/Flux_(metallurgy)) which teaches the removal of oxidation from the metal. Furthermore since Ross teaches fluxing agent can be ammonium fluoride which is one of the etching agent taught and claimed by the applicant (claim 7), it is therefore expect to behave like an etching agent. For the this reason claims 1-12, 17 and 19 are remained rejected in view of Ross and Tecle.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NGOCLAN T. MAI whose telephone number is (571)272-1246. The examiner can normally be reached on 8:30-5:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Roy King/
Supervisory Patent Examiner, Art Unit
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n.m.